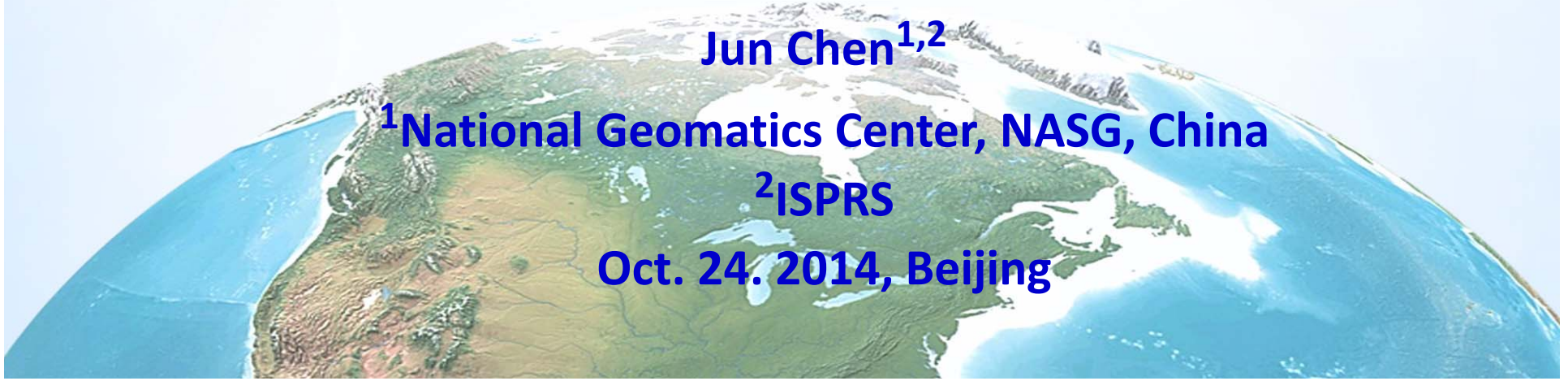
3rd UN-GGIM High Level Forum

Beijing, China, 22-24 October 2014

Working Together to Create an UN-GGIM GlobeLand30 Platform



Jun Chen[1,2]

[1]National Geomatics Center, NASG, China

[2]ISPRS

Oct. 24. 2014, Beijing

Contents

Today: a Photo Taken in Morning

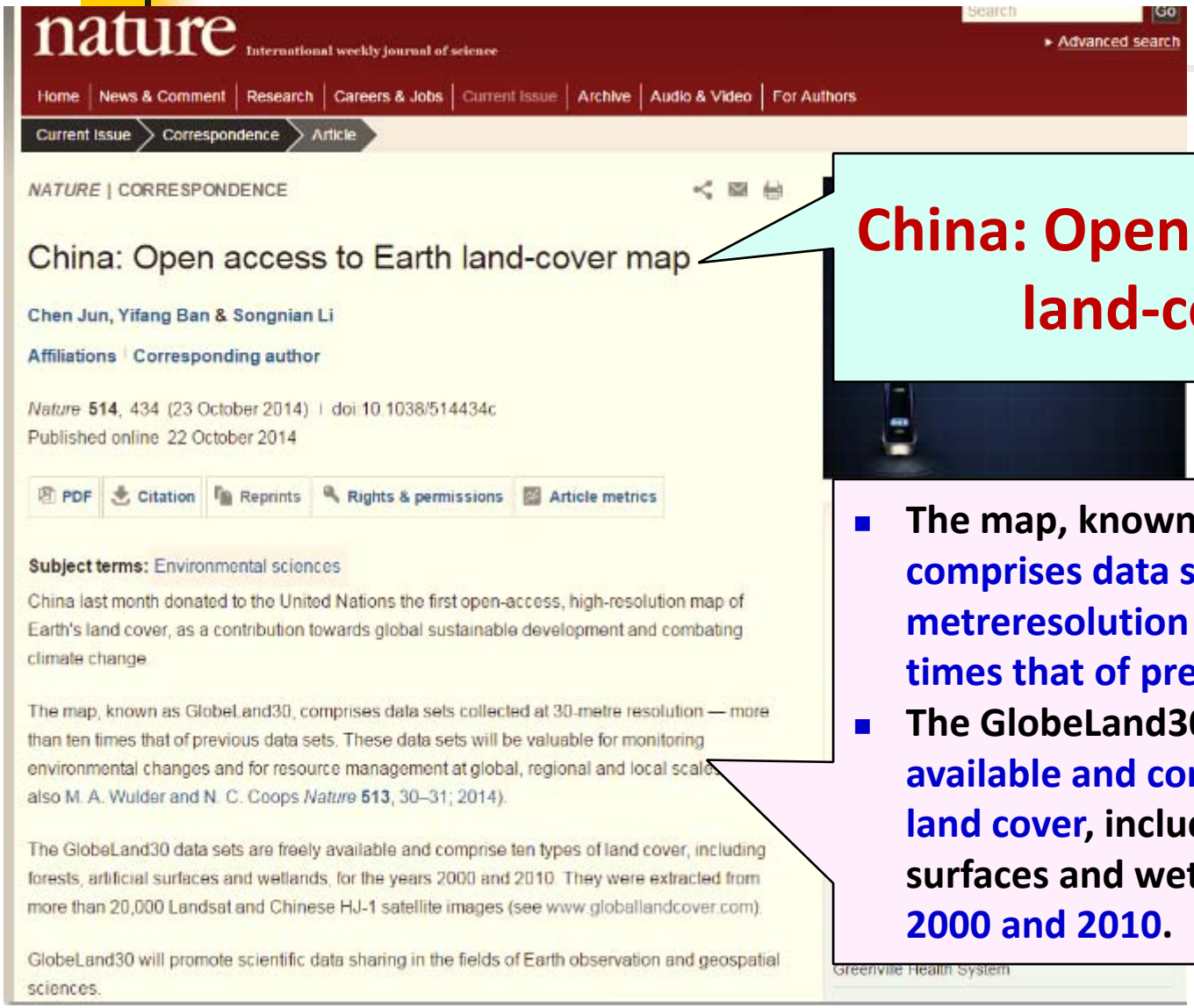
?

Globeland30

the first open-access, high-resolution map of Earth's land cover

Dr. Pascal Peduzzi
Head of Global Change and Vulnerability Unit
United Nations Environment Programme

Yesterday: Nature published (514:434, 23 Oct. 2014)



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Current Issue > Correspondence > Article

NATURE | CORRESPONDENCE

China: Open access to Earth land-cover map

Chen Jun, Yifang Ban & Songnian Li

Affiliations | Corresponding author

Nature **514**, 434 (23 October 2014) | doi:10.1038/514434c
Published online 22 October 2014

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Subject terms: Environmental sciences

China last month donated to the United Nations the first open-access, high-resolution map of Earth's land cover, as a contribution towards global sustainable development and combating climate change.

The map, known as GlobeLand30, comprises data sets collected at 30-metre resolution — more than ten times that of previous data sets. These data sets will be valuable for monitoring environmental changes and for resource management at global, regional and local scales (see also M. A. Wulder and N. C. Coops *Nature* **513**, 30–31; 2014).

The GlobeLand30 data sets are freely available and comprise ten types of land cover, including forests, artificial surfaces and wetlands, for the years 2000 and 2010. They were extracted from more than 20,000 Landsat and Chinese HJ-1 satellite images (see www.globallandcover.com).

GlobeLand30 will promote scientific data sharing in the fields of Earth observation and geospatial sciences.

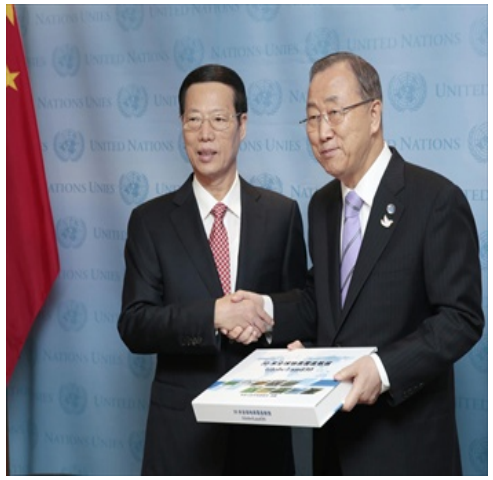
Greenville Health System

China: Open access to Earth land-cover map

- **The map, known as GlobeLand30, comprises data sets collected at 30-metreresolution — more than ten times that of previous data sets.**
- **The GlobeLand30 data sets are freely available and comprise ten types of land cover, including forests, artificial surfaces and wetlands, for the years 2000 and 2010.**

Last Month: Donated to UNs

Sept.22 2014, New York, donation ceremony of GlobeLand30

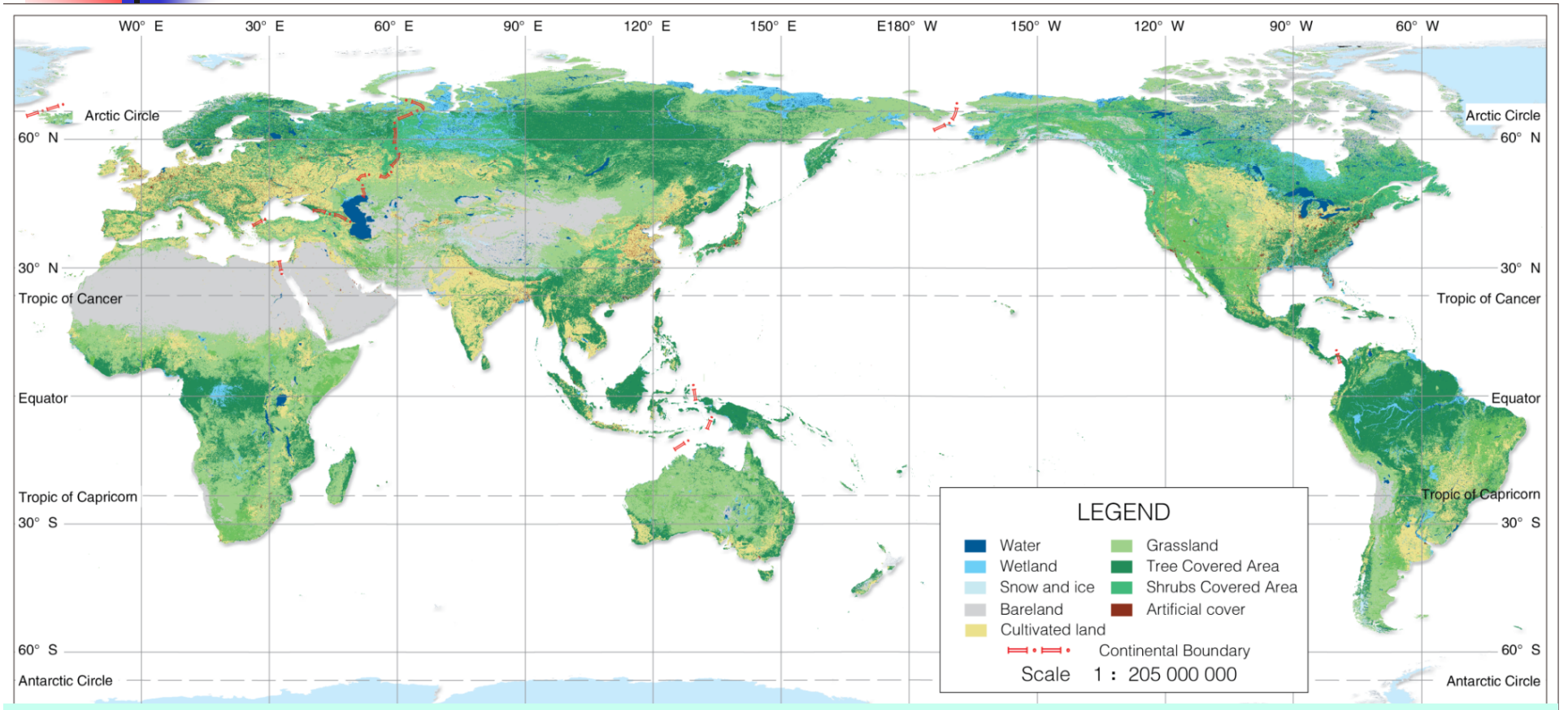


UN SG Ban Ki-moon said:

- **The World needs solid, science-based information for making wise decisions for sustainable development.**
- **These detailed data sets will help us to better understand, monitor and manage changes in land cover and land use all over our planet**

Contents

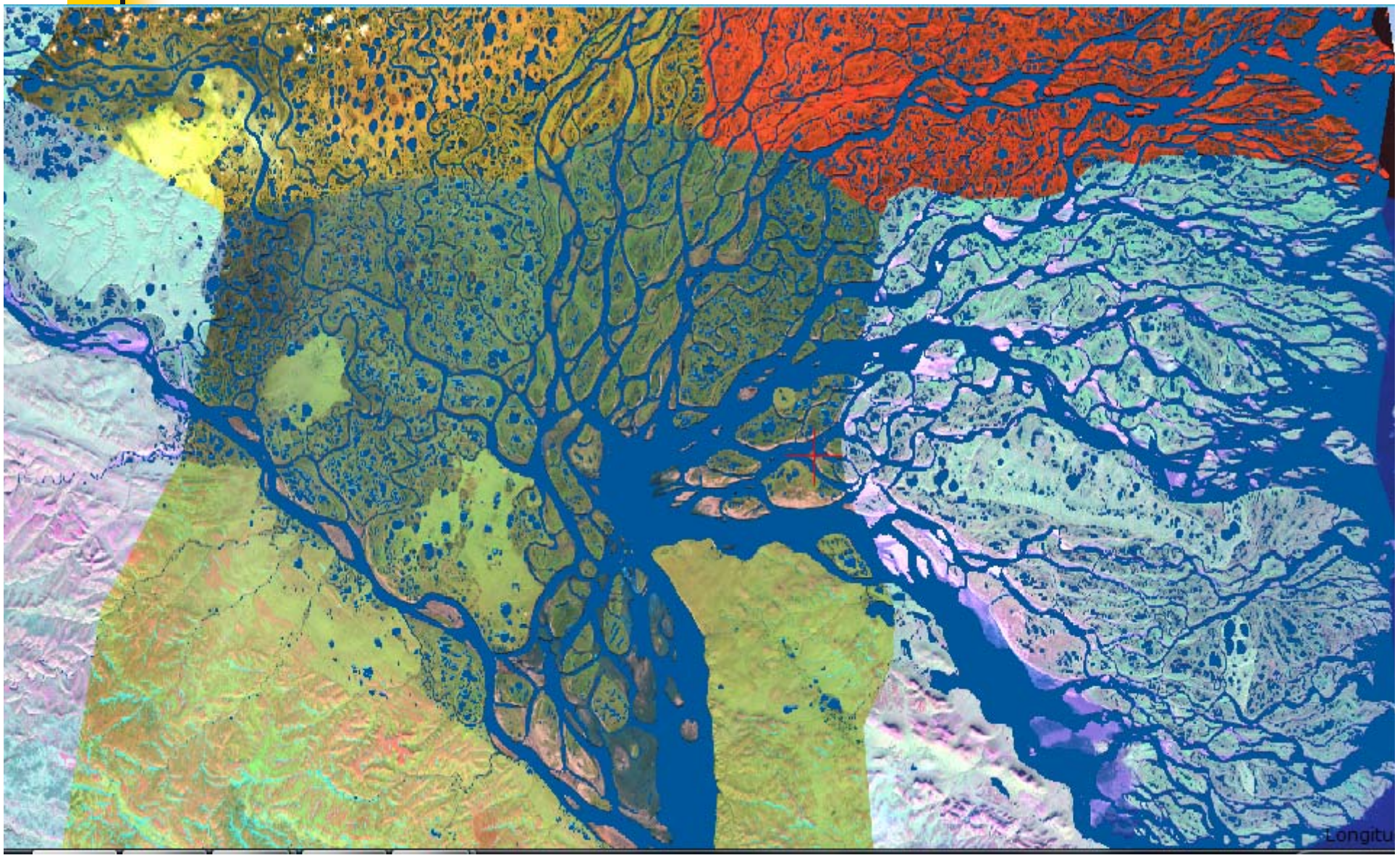
GlobeLand30



10 Classes: Open Water, Wetland, Artificial Cover, Cropland, Forest, Shrubland, Grassland, Bare Land, Tundra , Perm.snow & Glac

2 Base-line years: 2000/ 2010

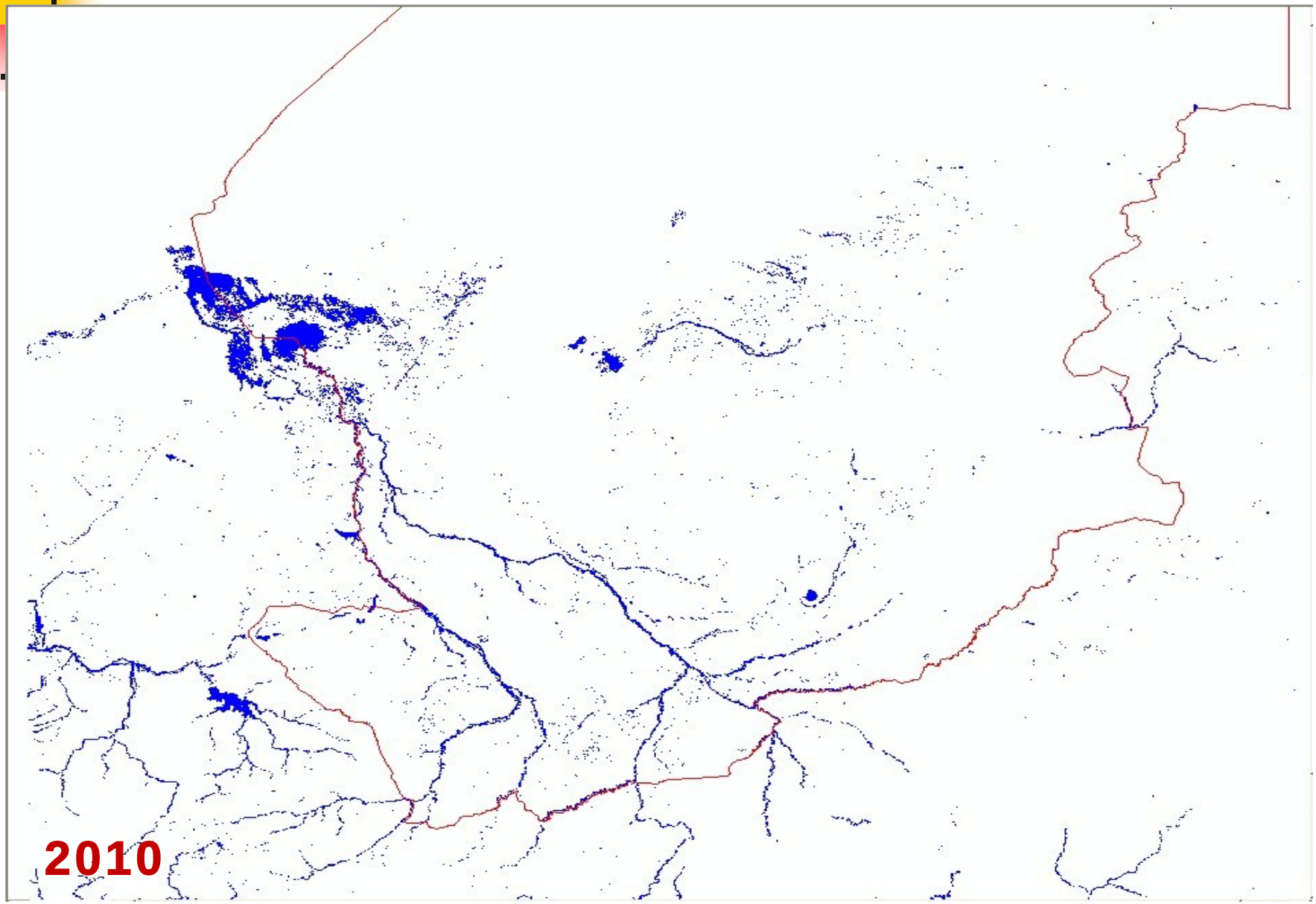
GlobeLand30



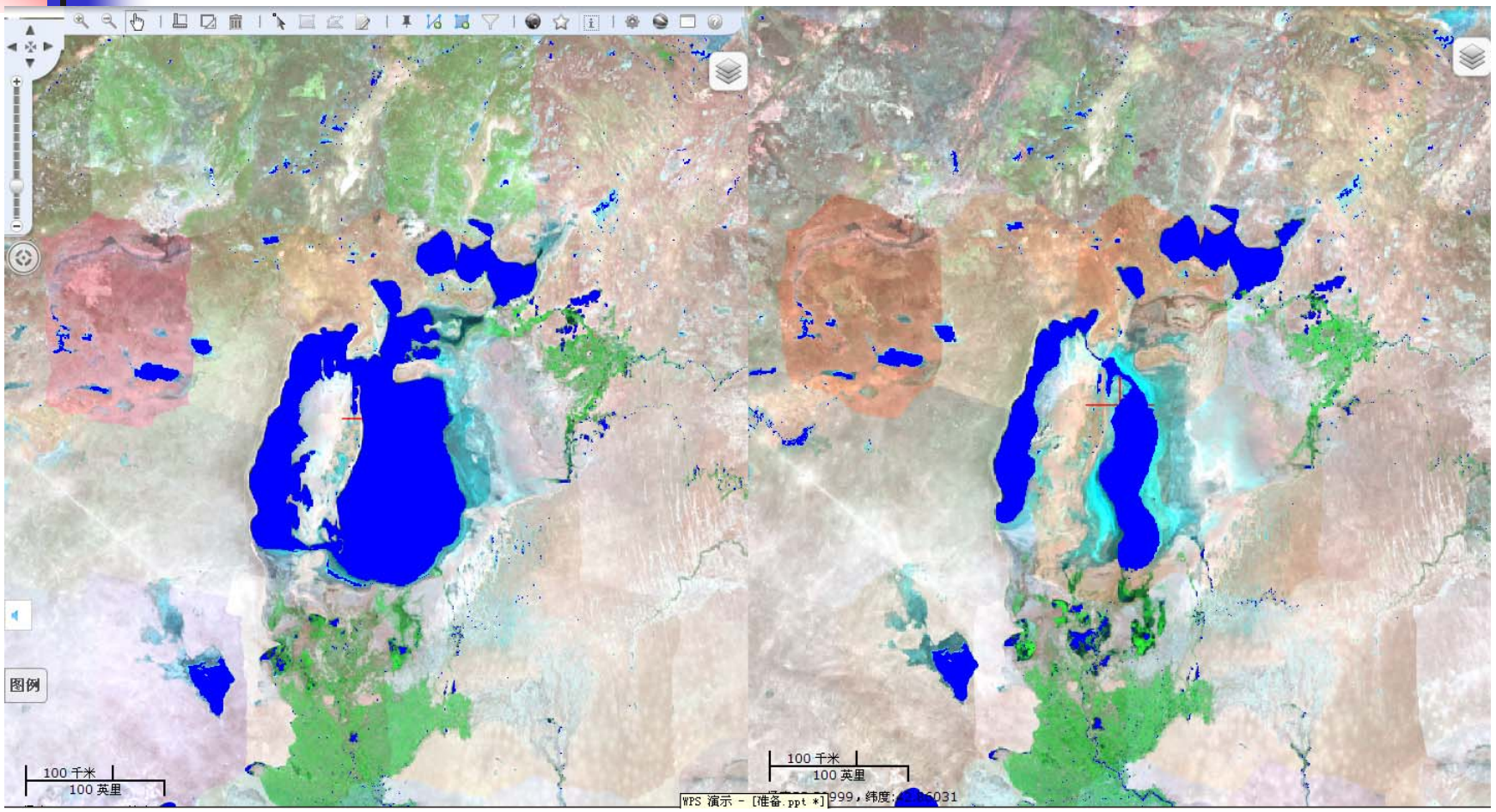
Cultivated Land

New Valley, Governorat, Egypt, 2010

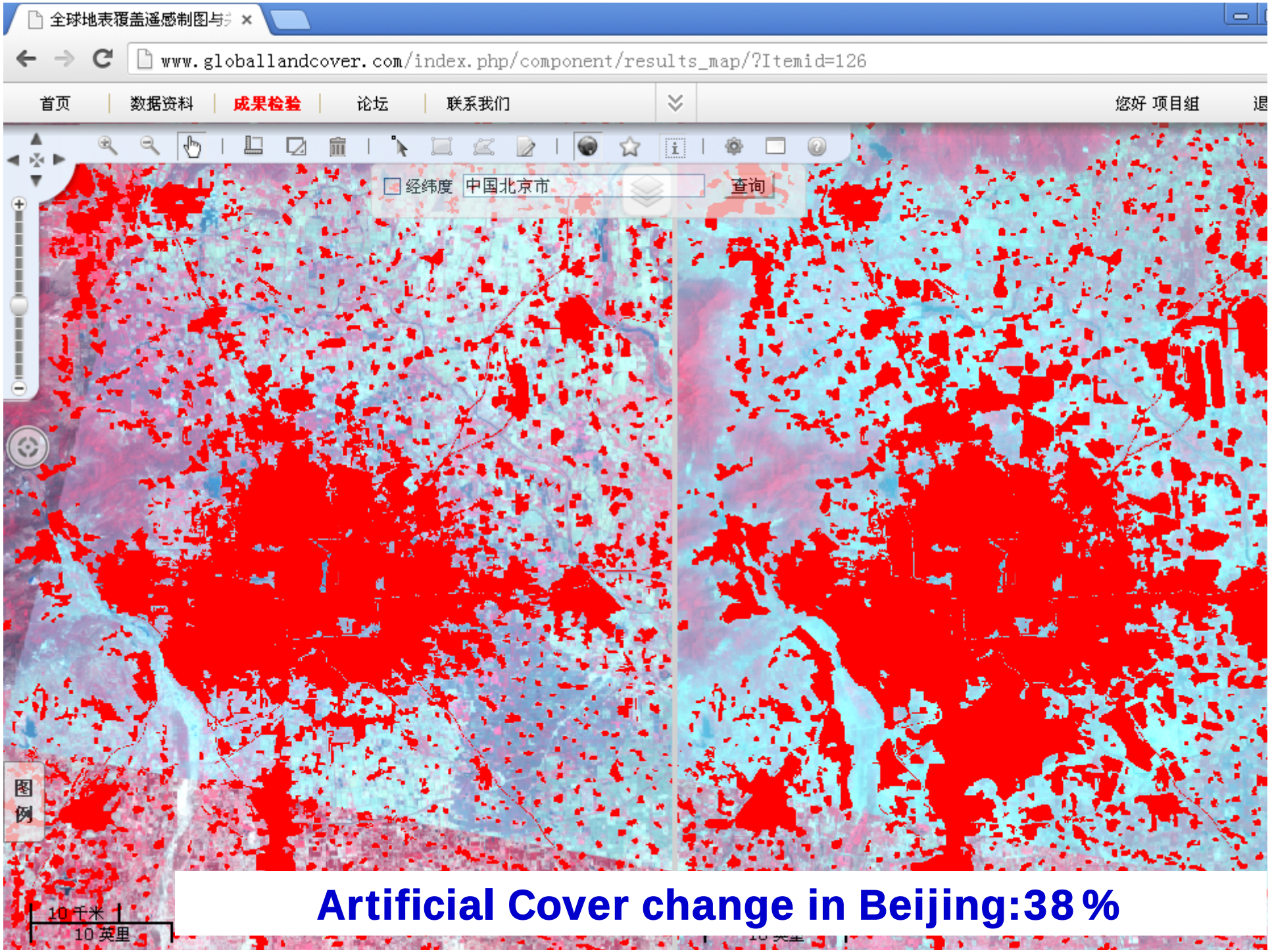
Chad Lake



Water change in Aral Sea



近10年，咸海面积萎缩了近50%。


全球地表覆盖遥感制图与
www.globallandcover.com/index.php/component/results_map/?Itemid=126
首页
数据资料
成果检验
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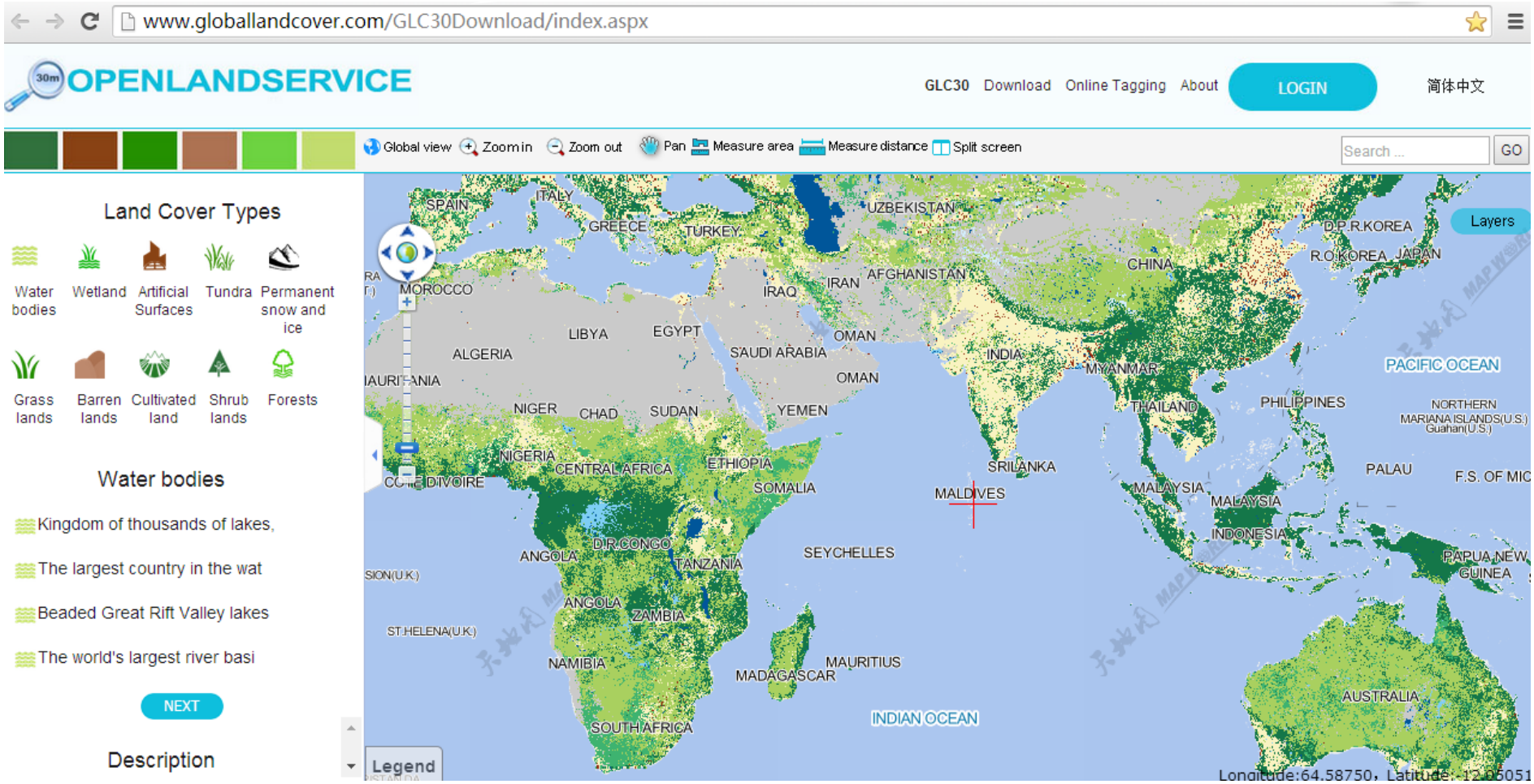
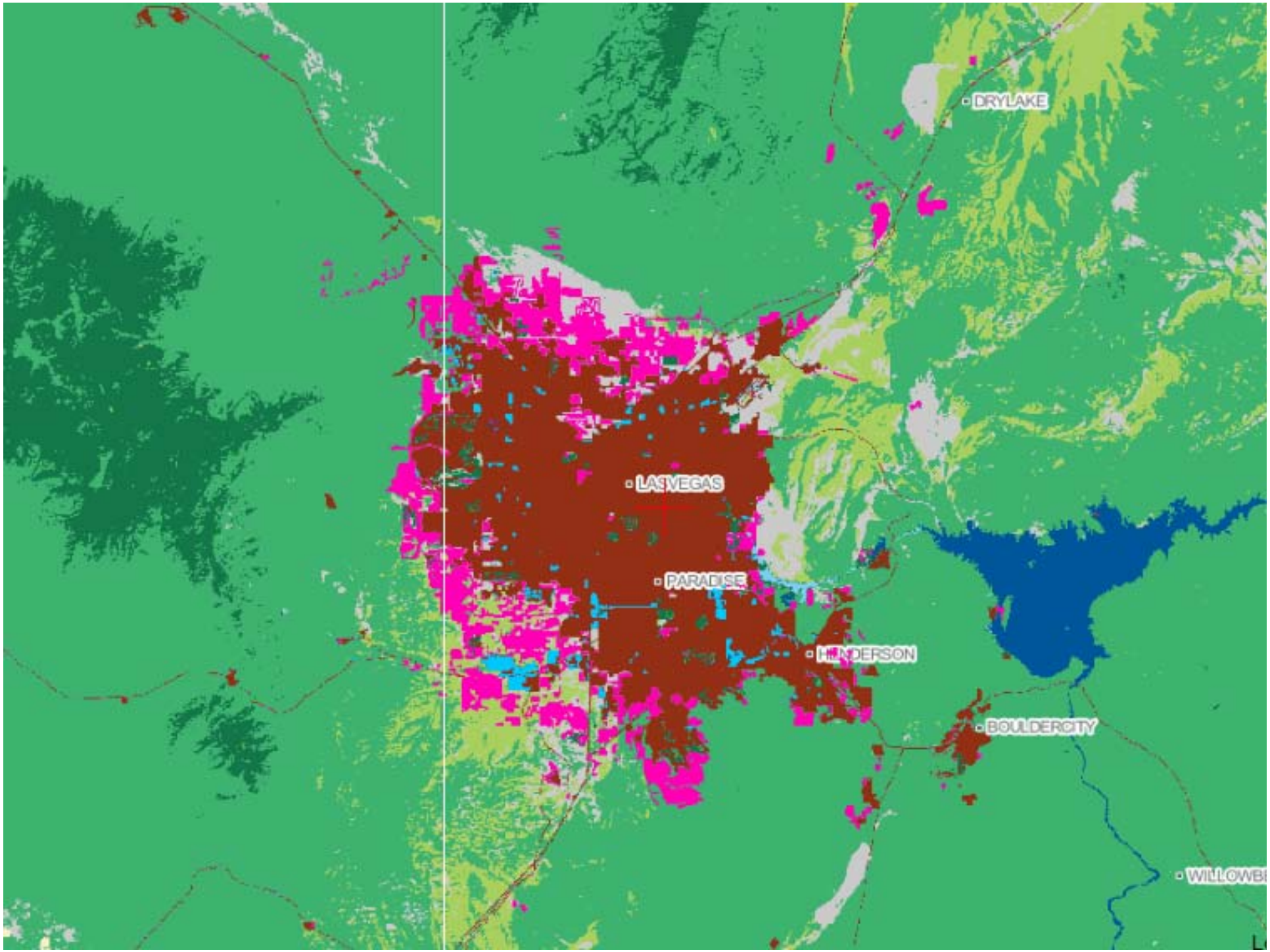
经纬度
中国北京市
查询
图例
10 千米
10 英里
Artificial Cover change in Beijing:38％

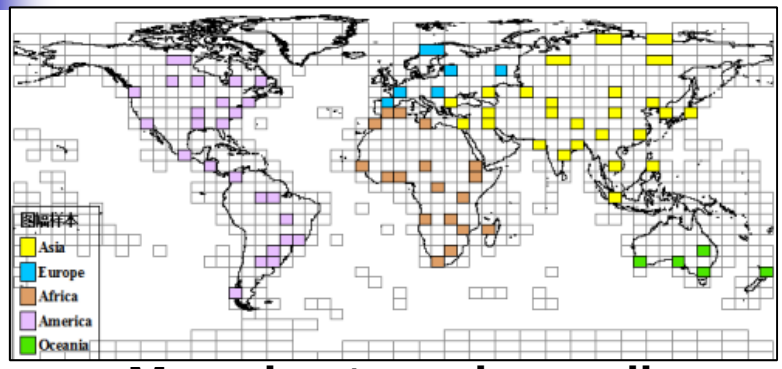
Web-based Service

www.globallandcover.com

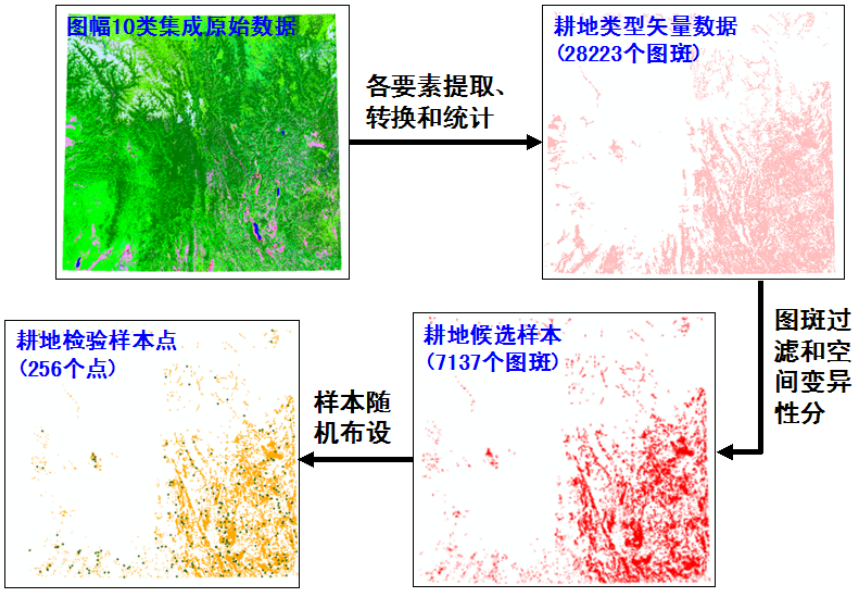



DRYLAKE
LAS VEGAS
PARADISE
HENDERSON
BOULDER CITY

Accuracy Assessment



Map sheets and smapling



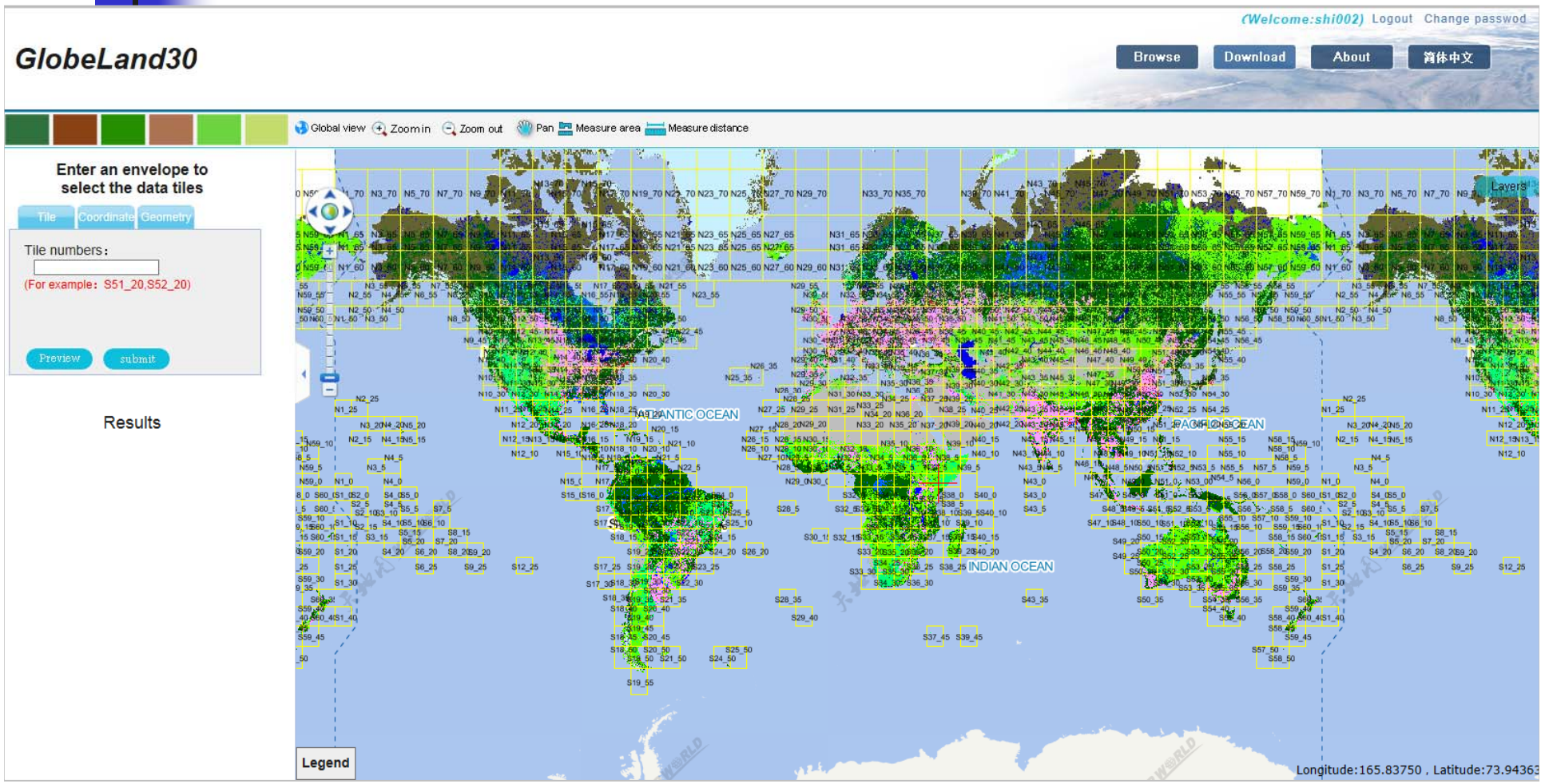
- Map sheets selected: 80
- Total samples: 154,070

Region	Map sheets	smaples
Asia	26	60165
Europe	6	12792
Africa	18	25656
America	25	45822
Oceanic	5	9635
Total	80	154070

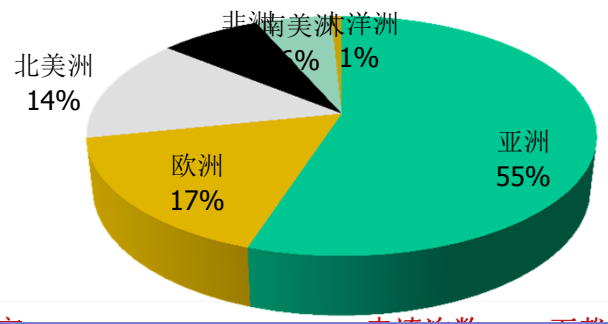
Accuracy Assessment

	2010		
Class	User acc.	Area %	Total accur.
croplands	***83.06%***	***0.1619***	***83.50%*** ***±0.18%***
forest	***89.00%***	***0.0174***	
grass	***76.88%***	***0.2910***	
shrub	***72.52%***	***0.0869***	
wetland	***79.63%***	***0.0340***	
water	***92.09%***	***0.0264***	
artificial	***86.97%***	***0.0100***	
bareland	***77.33%***	***0.1830***	
Ice	***75.86%***	***0.0203***	

Open Data Access

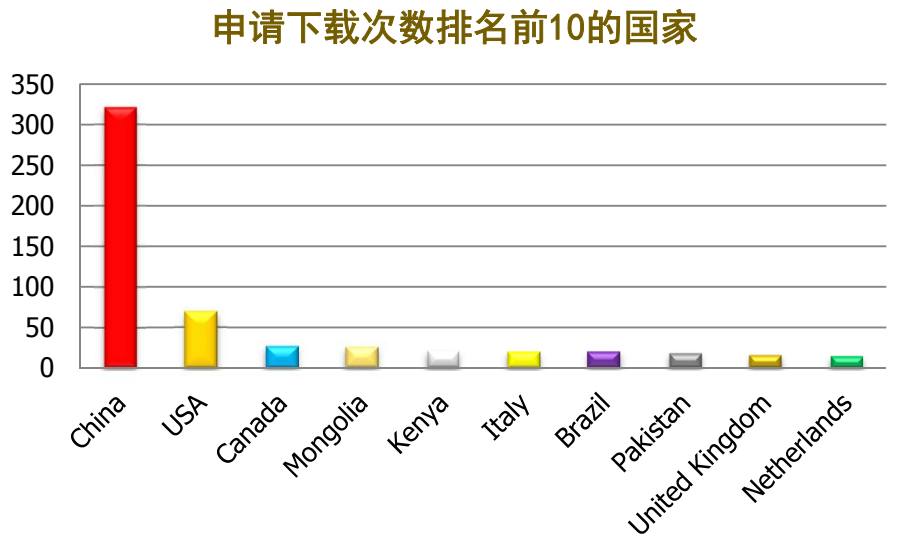


Downloading- Up to Oct.20, 2014



- **810** downloads
- **16000** map sheets downloaded
- **61** countries

国家	申请次数	下载图幅
中国 China	322	7695
美国 USA	70	808
加拿大 Canada	27	537
蒙古 Mongilia	26	134
肯尼亚 Kenya	22	248
意大利 Italy	21	1241
巴西 Brasil	20	123
巴基斯坦 Pakistan	18	83
英国 UK	16	288
荷兰 Neitherlands	15	562



Geospatial Statistics of Artificial surface

Country/ Region	Area in 2000 (10,000 km2)	Area in 2010 (10,000 km2)	Variation Rate (%)	Increase Proportion (%)
China	14.49	16.10	11.17	28.17
U.S.A	22.38	23.56	5.26	20.48
Russia	9.50	9.83	3.46	5.73
Mexico	2.32	2.50	7.87	3.18
India	4.90	4.99	1.79	1.53
Brazil	3.18	3.24	1.83	1.01
Japan	2.50	2.54	1.55	0.67
France	2.86	2.90	1.29	0.64
Germany	3.02	3.02	0.03	0.01
Ukraine	4.09	4.09	<0.01	<0.01

- Total area in 2010: 1.1875 million km2 (0.9% of earth land surface)
- Increase from 200-2010: 57,400km2 (rate of 5.08%. Asia- 43.55%, and Africa 4.81%
- USA and China are the largest and 2nd countries

Preliminary Statistics (2010)

	Cultiv. land	Forest	Grass	Shrub	Wetland	Water	苔原	Artifi. Cover	Bare land	Ice/ Snow
Asia	740.16	1304.55	1055.15	60.36	87.01	82.13	159.72	43.22	850.33	18.47
Europe	387.06	322.02	105.45	44.52	20.09	28.00	43.10	32.54	10.21	9.95
Africa	223.27	513.94	955.85	221.01	38.32	29.34	0.00	7.87	1001.85	0.00
N. America	285.15	695.95	204.12	295.74	107.06	142.10	424.38	29.36	22.01	209.27
S. America	230.57	796.79	339.83	238.23	73.96	26.28	0.00	6.21	54.73	4.72
Oceanic	60.57	200.65	470.41	79.88	9.32	5.95	0.00	1.92	20.60	0.43
Total	1926.79	3833.90	3130.81	939.75	335.76	313.80	627.20	121.11	1959.74	242.83
%	14.35	28.54	23.31	7.00	2.50	2.34	4.67	0.90	14.59	1.81

unit：10,000km2

Cultivated land converted to Artificial Cover (Built-up area) from 2000-2010

		Asia	Europe	Africa	North America	South America	Oceania	Global
Cultivated land	Area(km^2)	17968.43	3457.04	2525.80	4074.99	666.82	179.34	28872.41
	Proportion (%)	**72.01**	60.43	29.47	27.26	27.91	20.86	**50.26**
Forest land	Area(km^2)	1756.84	416.31	1134.09	3859.18	376.62	185.92	7728.96
	Proportion (%)	7.04	7.28	13.23	25.82	15.76	21.62	13.46
Grassland	Area(km^2)	3749.71	643.80	3479.60	3093.45	755.19	344.52	12066.26
	Proportion (%)	**15.03**	11.25	40.59	20.69	31.61	40.07	21.01
Shrub	Area(km^2)	158.09	284.31	517.68	2563.72	306.59	82.71	3913.11
	Proportion (%)	0.63	4.97	6.04	17.15	12.83	9.62	6.81
Wet land	Area(km^2)	33.68	127.33	27.54	743.92	17.93	20.46	970.87
	Proportion (%)	0.13	2.23	0.32	4.98	0.75	2.38	1.69
Waters	Area(km^2)	2.21	609.83	39.98	241.20	26.11	24.19	943.52
	Proportion (%)	0.01	10.66	0.47	1.61	1.09	2.81	1.64
Bare land	Area(km^2)	1282.04	182.18	849.38	372.80	240.00	22.83	2949.24
	Proportion (%)	5.14	3.18	9.91	2.49	10.04	2.66	5.13
Sub-total	Area(km^2)	24951.00	5720.80	8574.07	14949.26	2389.26	859.97	57444.37
	Proportion (%)	43.44	9.96	14.93	26.02	4.16	1.50	100.00

Contents

Global Challenges Need Global Solutions

(Nature : 18 Oct 2012)

Global challenges need global solutions

Subra Suresh sets out the institutional reforms needed for collaborative action among international research-funding agencies to tackle the challenges humanity faces.

The challenges confronting global decision-makers are growing in complexity, intensity and urgency. Environmental change, pandemics, natural disasters, nuclear catastrophes, displaced populations, water shortages, rising ocean levels and widespread malnutrition do not stop at national borders or the water's edge. Addressing such issues requires cross-border cooperation and pooled resources.

Fortunately, the rapid growth in research capability around the world provides a strong foundation for finding science and engineering solutions to global challenges. Convinced that frontier research and technological innovation will spur strong economic growth, more and more countries are committing substantial sums to science and engineering research and education. Collectively, global investment in research and development has doubled within the past 15 years to about US$1.4 trillion annually (amount adjusted for purchasing-power parity)[1,2], even through the turmoil created by the global financial crisis.

I am convinced that greater collaboration will maximize the effectiveness of those investments. Without a coordinated global response, humanity will not overcome the challenges it faces. That is why I have strongly supported the efforts of the US National Science Foundation (NSF) to harmonize global research initiatives among science-funding agencies.

FOUR RECOMMENDATIONS

What are the barriers to cross-border scientific collaboration? One is the current framework for investment in research and development. Funding is governed and constrained largely by national and local policies, processes and priorities. These frequently impede cooperation among different government agencies, institutions and individuals. There are many more. For example, scientific peer review needs to be consistent across borders. Scientists need to be assured that data generated through cross-border collaborations meet certain standards of quality and research integrity, and that they will be preserved and accessible to other researchers — and the public — in the future. There are issues of intellectual-property rights, and constraints on the mobility of scientists.

THE NEW MAP OF SCIENCE
The changing global landscape of research. nature.com/global

Removing these barriers will require proactive principles and policies, developed and implemented collectively. To this end, I have four recommendations.

Standardize the principles for merit review and research integrity. Every funding agency needs a transparent, impartial and consistent peer-review process to pick the most scientifically productive ideas and people in the most ethical way. The patchwork of review processes currently in use in different countries is hindering scientific progress. Consequently, there is growing enthusiasm about, and commitment to, coordinating efforts to improve peer review from many science-funding agencies and other organizations in government, education, and the charitable and private sectors, in both developing and developed countries.

To support this, the Global Research Council (GRC; www.globalresearchcouncil.org) was established in May at the NSF, bringing together leaders of key science-funding organizations. At its inaugural meeting, some 50 heads of research councils — mostly from countries within the G20 and the Organisation for Economic Co-operation and Development — collectively

- **The challenges confronting global decision-makers are growing in complexity, intensity and urgency.**
- **Environmental change, pandemics, natural disasters, nuclear catastrophes, displaced populations, water shortages, rising ocean levels and widespread malnutrition *do not stop at nation -al borders or the water's edge.***

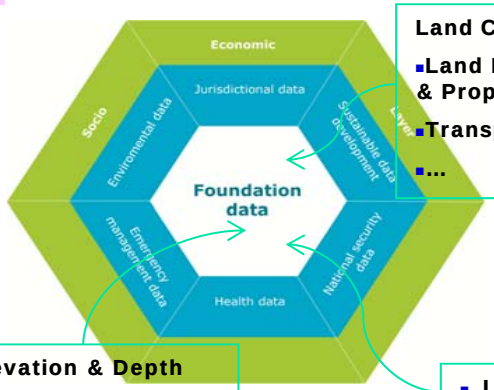
- ***Addressing such issues requires cross-border cooperation and pooled resources.***

Sustaining 'The Future We Want'

RIO+20
United Nations Conference on Sustainable Development

- Measure
- Monitor
- Manage

Depends critically on global geospatial information



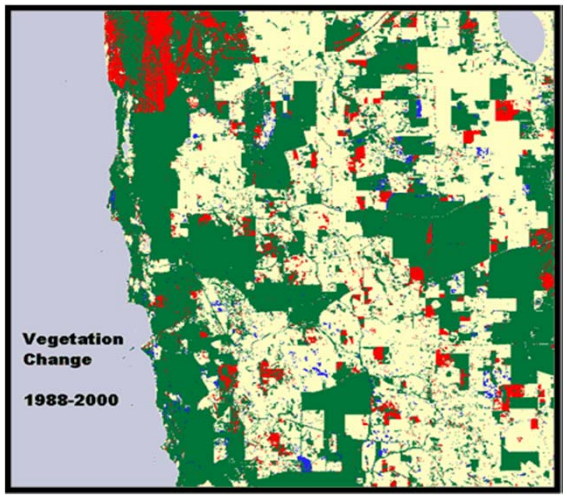
Land Cover
- Land Parcels & Property
- Transport
- ...

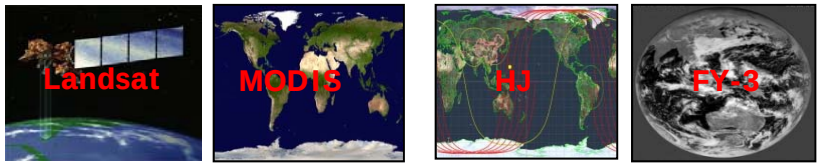
- Elevation & Depth
- Geocoded Addressing
- Administrative Boundaries

- Imagery
- Place Names

Land Cover and Change
- 30m Global Map

- 30m permits detection of land change at the scale of most human activity [Loveland, 2010]





30m Imagery (2000)

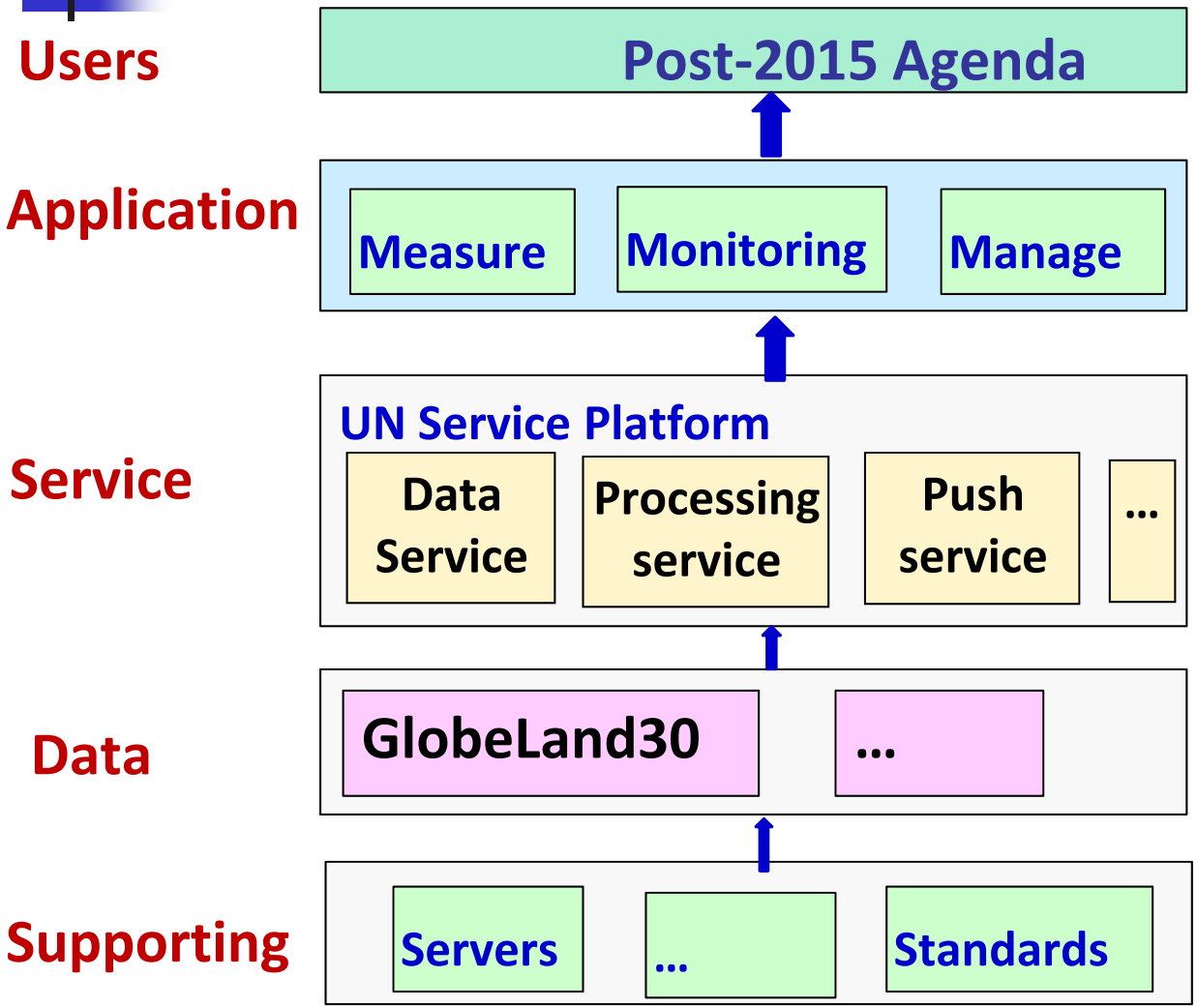
30m Imagery (2010)

Image classification

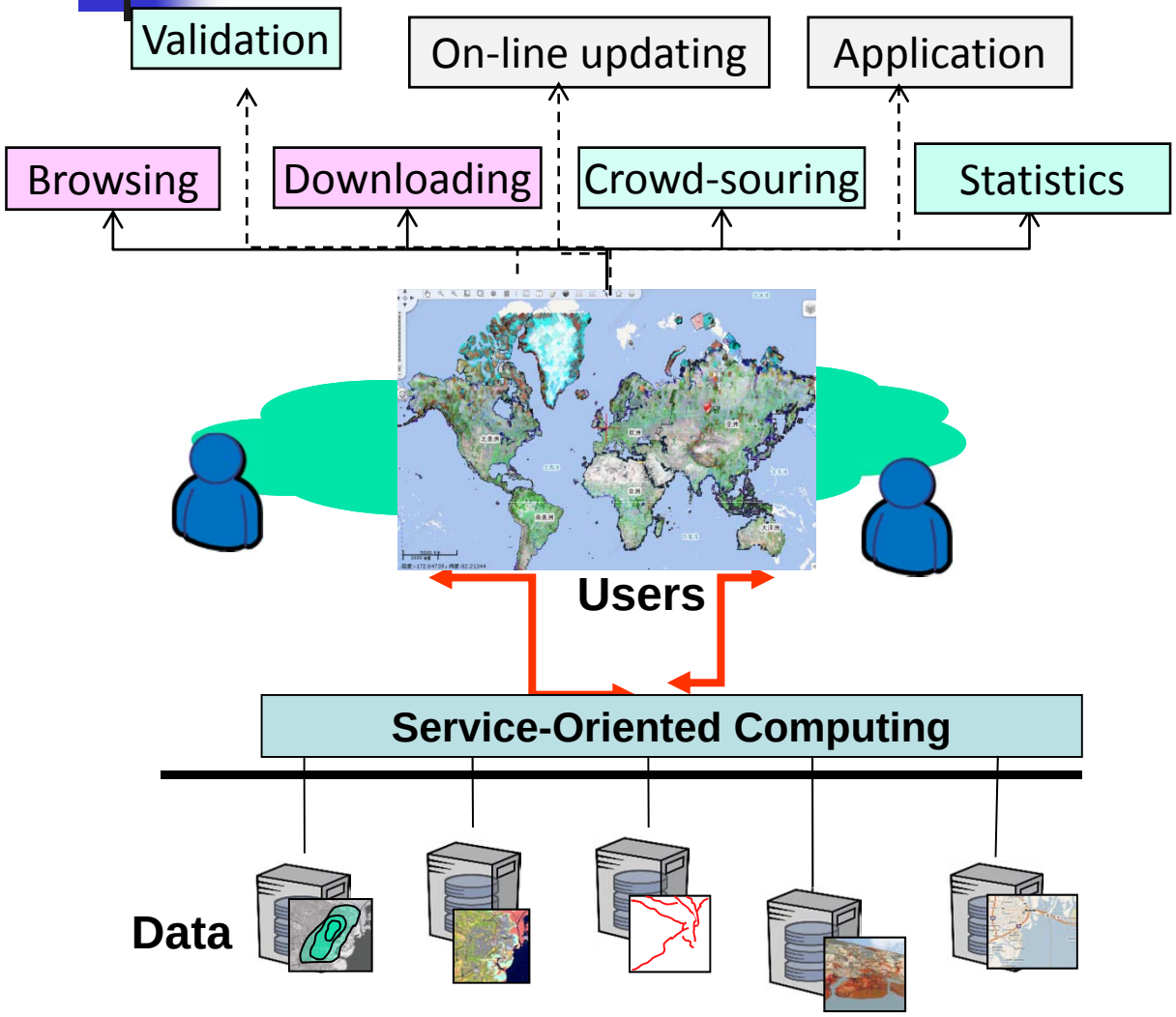
Land Cover Map (2000/2010)

GlobeLand30

Supporting Post-2015 Agenda with Global Geo-spatial Information

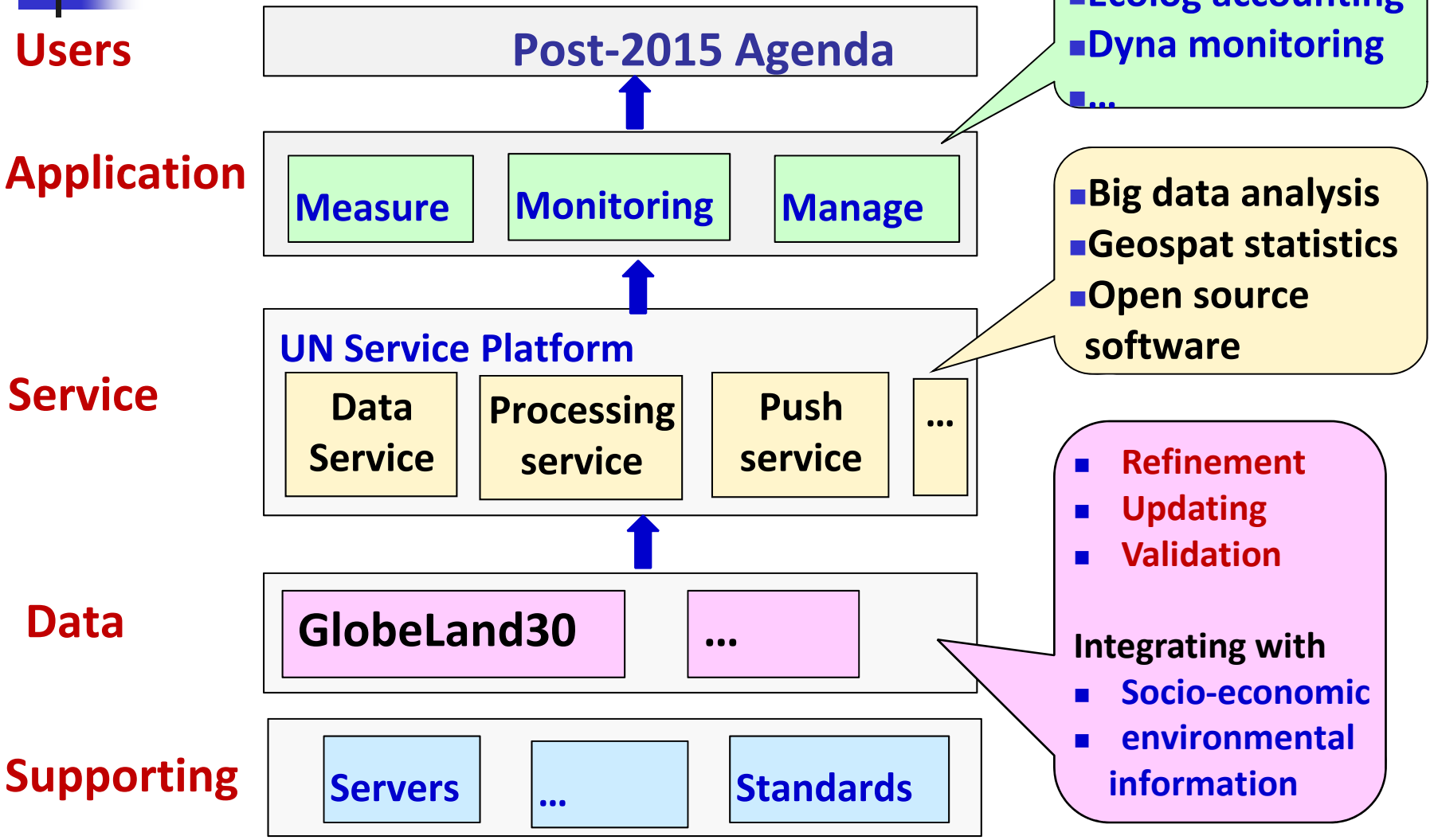


GlobeLand30 Service

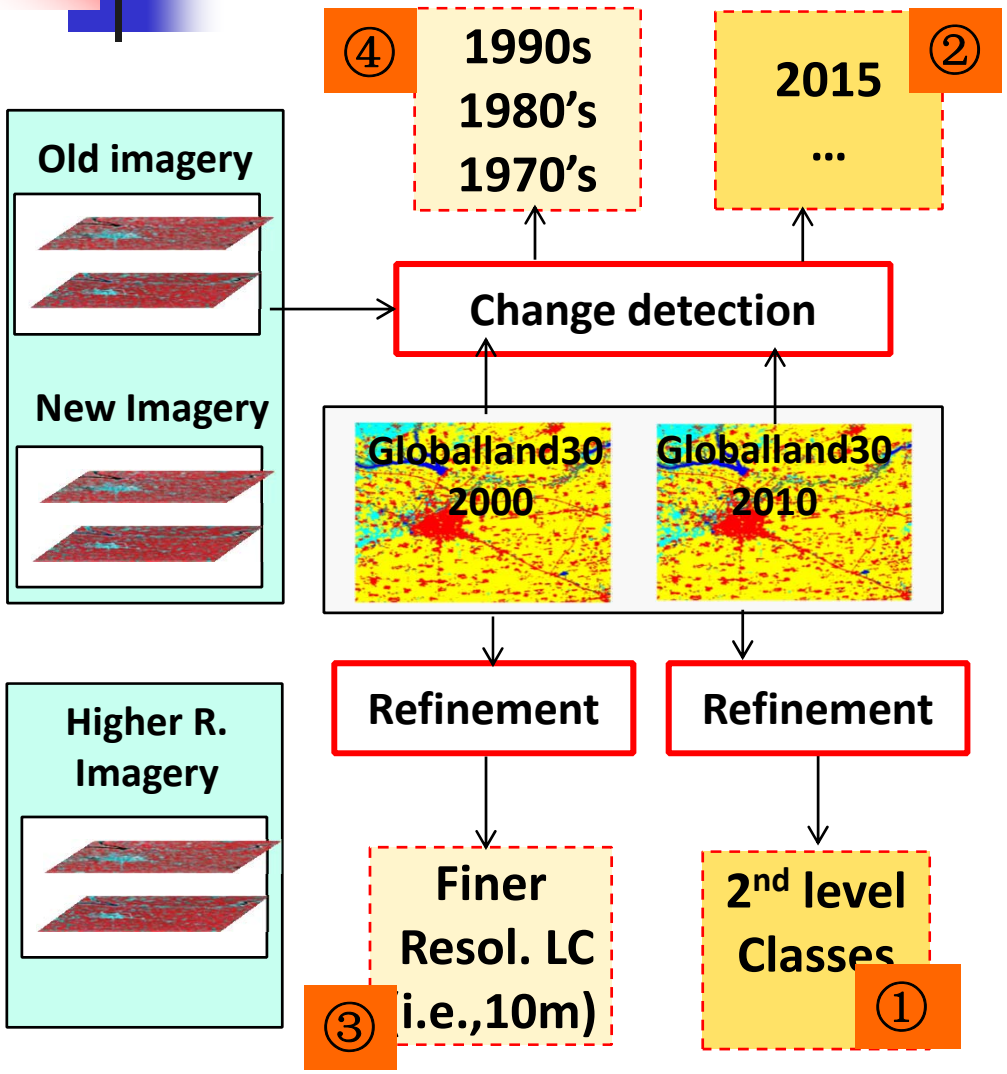


- **Enabling easier and more efficient data sharing and information service**

More Works to be Done



Continuous Updating and Refinement



① 2nd level classification (for certain classes)

② Globalland30-2015

③ Finer resolution (10m) mapping (hot spot areas)

④Historical mapping (backward)

Big Data Analyis

Global Scale

Key classes

Typical areas

Data processing

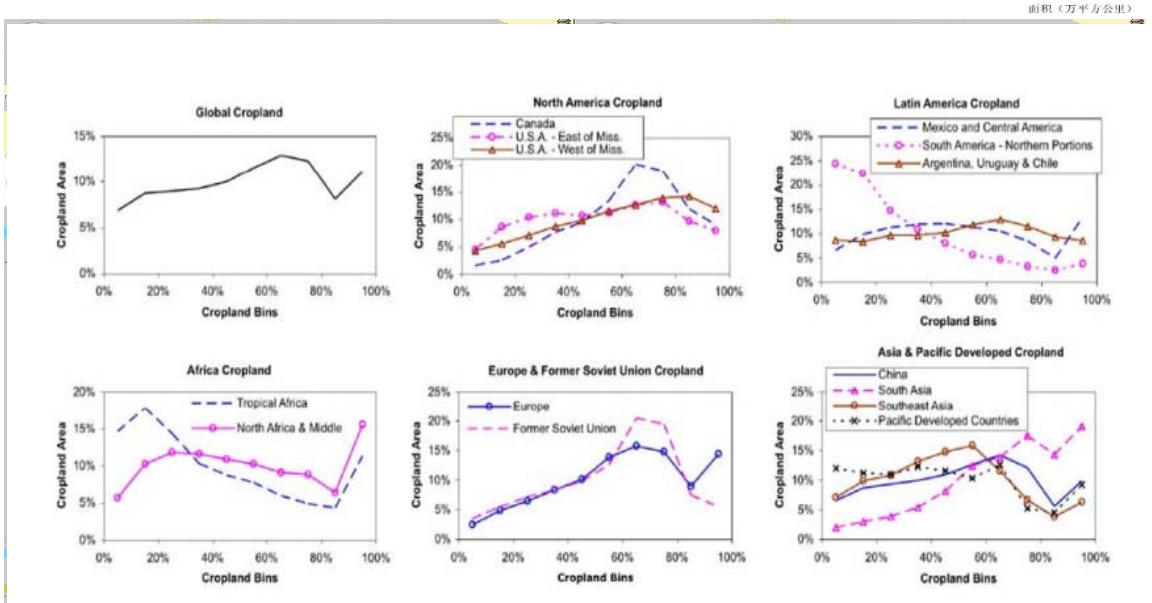
Cultivated land analysis

Wetland analysis

Built-up area analysis

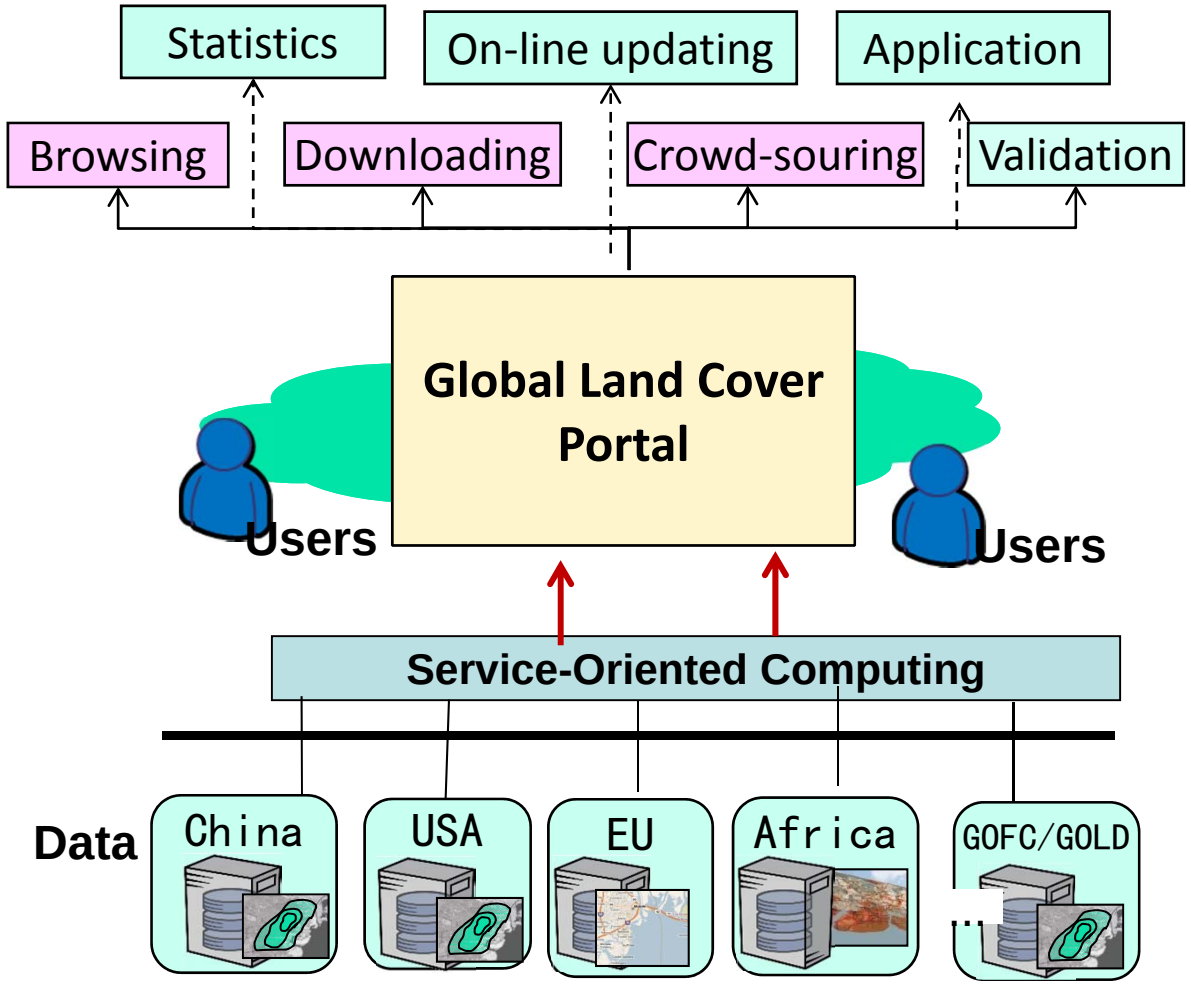
Visualization and Reporting

Spatio-temporal Analysis of Cultivated Land



Socio-economic consequences

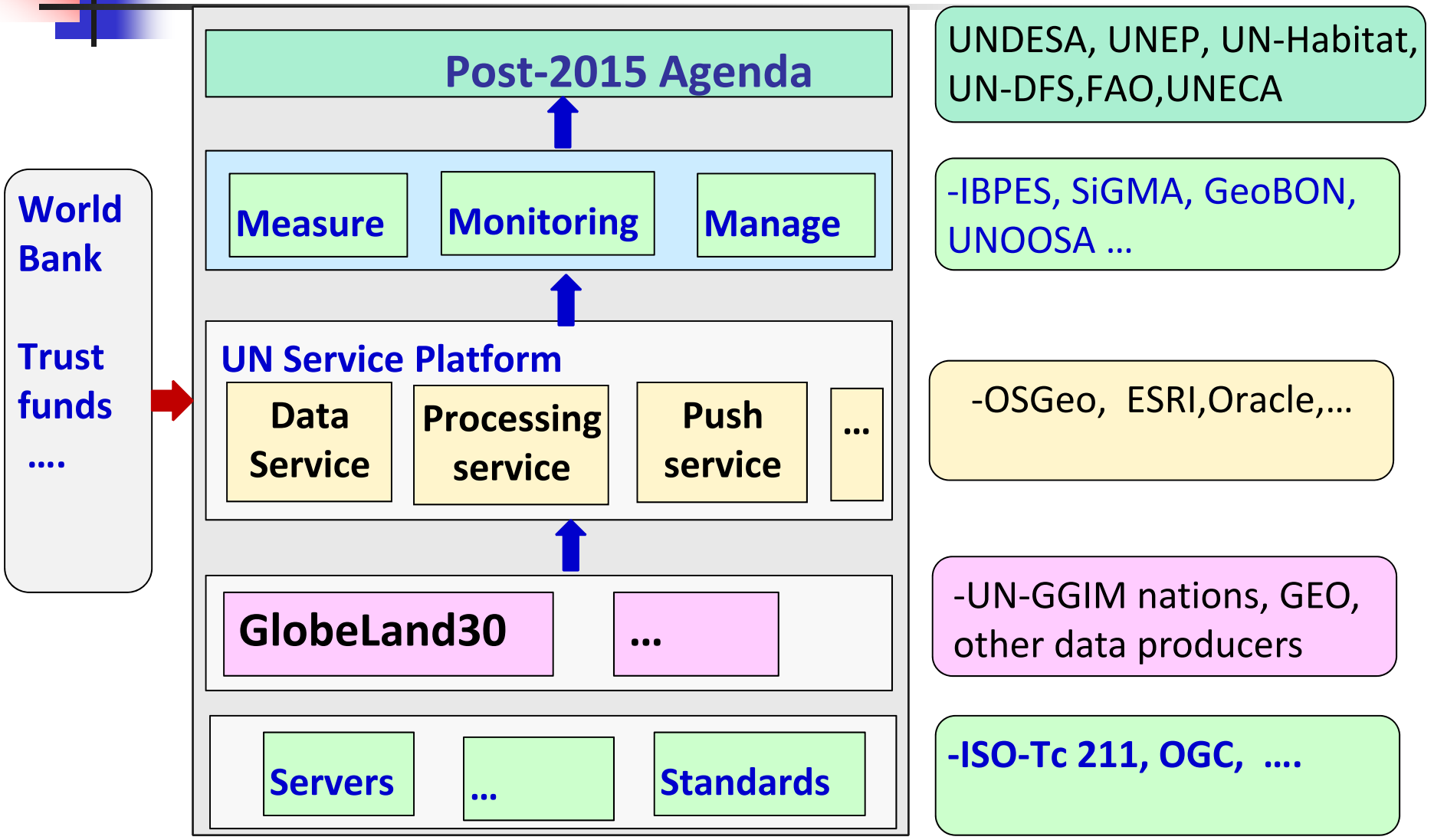
Unique Portal for LC Information



- Connecting all major global, national and regional land cover websites to provide 'one-stop' service
- Connecting all other geo-spatial information resources

Contents

Cross Border/Region and Tran-Disciplinary Cooperation



Develop a Road Map

With the significant technological advances in the field of earth observation, geo-information sciences, service-oriented computing, it is now feasible and time to develop a road map for creating a collaborative Global Geospatial Information Infrastructure through across border and trans-disciplinary collaboration

Working Together

3 important issues to be addressed

- community engagement, related to the inclusion and serving the demands of the global community;
- technological architecture, related to data, services and applications;
- Legal and Governance, related to property and access rights to data, global policy coordination.

3 CO principles

- Co-design
- Co-development
- Co-operation

- Technical Working Group
- International advise committee

Contents

UN-GGIM- a Key Player

UN-GGIM is at the core position to promote and lead such an important task with a close collaboration with other UN systems, member nations, and relevant organizations such as GEO, JBGIS, ICSU and ISOTC 211, OGC.

Supporting Future Earth with Global Geo-information

A Joint Workshop
June 9-10, 2015, Beijing

CHEN JJUN
Chief Scientist, NGCC (NASG)
President, ISPRS

Thanks for Your Attention!

www.globallandcover.com

chenjun@nsdi.gov.cn

A Starting Point